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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,413	02/05/2004	Gregory G. Cappiello	62687.000111	3875

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EXAMINER

AMARI, ALESSANDRO V

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.:

10/771,413

Applicant(s)

CAPPIELLO, GREGORY G.

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,9-12,15,16 and 19-22 is/are rejected.
- 7) ☒ Claim(s) 3,8,13,14,17 and 18 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/3/2004&2/5/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/5/2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, 5, 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sappey et al US 6,400,509.

In regard to claims 1 and 6, Sappey et al teaches (see Figures 3-5) a diffraction grating comprising a reflective material (40) having a blazed surface as shown in Figures 3-5 with a blaze angle about 31 degrees; and an optically transmissive material (air, $n_{\text{air}} = 1.0$) disposed adjacent the reflective material having an index of refraction the blazed surface of the reflective material has approximately 172 grooves per millimeter as described in column 5, lines 44-54.

However, in regard to claims 1 and 6, Sappey et al does not teach that the blaze angle is between 32 and 41 degrees or that the blazed surface has approximately $(350 \pm 30) \times n$ number of grooves per millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the blaze angle and the period (i.e., number of grooves per millimeter), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated

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to adjust the blaze angle and the period for the purpose of improving the diffraction efficiency of the grating. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

Regarding claims 4 and 9, Sappey et al teaches that the reflective material is at least one of the following: gold, aluminum and silver as described in column 5, lines 35-37 and 48-51.

Regarding claims 5 and 10, Sappey et al teaches a substantially planar substrate on which the reflective material is formed as shown in Figures 3-5 and as described in column 5, lines 20-26.

3. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sappey et al US 6,400,509 in view of Knop US 4,426,130.

Regarding claims 2 and 7, Sappey et al teaches the invention as set forth above but does not teach that the number of grooves per millimeter is between about 520-560 or about 240-300. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the period (i.e., number of grooves per millimeter), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the period for the purpose of improving the diffraction efficiency of the grating. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

Further, in regard to claims 2 and 7, Sappey et al does not teach that the index of refraction of an optically transmissive material is between about 1.44 and about 1.64.

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In regard to claims 2 and 7, Knop teaches that the index of refraction of an optically transmissive material is between about 1.44 and about 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material of Knop in the device of Sappey et al in order to increase the efficiency of the grating as described in column 1, lines 62-68 and column 2, lines 1-3 of Knop.

4. Claims 11, 15, 16, 19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sappey et al US 6,304,692 in view of Sappey et al US 6,400,509.

In regard to claims 11, 15, 19 and 21, Sappey et al '692 teaches (see Figure 1) a communications apparatus utilizing optical communication comprising a plurality of carriers as described in column 4, lines 48-67 and column 5, lines 1-35 and a wavelength division device comprising a plurality of first coupling components (16) each first component capable of receiving a distinct carrier for carrying a signal; a second coupling component (14) adjacent the first coupling components and capable of receiving a distinct carrier for carrying one or more signals or a means (14, 16) for receiving one or more input signals and a diffraction grating (20) optically coupled to each carrier received by the first and second coupling components or optically coupled to the means for receiving and a means for coupling each optical signal diffracted by the diffraction grating onto one or more optical output signals over a wavelength range of at least approximately 30 nm as described in column 4, lines 48-67, column 5, lines 1-35 and column 7, lines 16-20.

However, in regard to claims 11, 15, 19 and 21, Sappey et al '962 does not teach that the diffraction grating comprises a blazed reflective material having a number of grooves per millimeter and a blazed angle between 32 and 41 degrees and an optically transmissive material disposed adjacent the reflective material having an index of refraction (n) wherein the number of grooves is approximately equal to $(175 \pm 30) \cdot n$ or $(350 \pm 30) \cdot n$ grooves per millimeter. Further in regard to claims 16 and 22, Sappey et al '962 does not teach that the number of grooves per millimeter is between about 240 and about 300.

In regard to claims 11, 15, 16, 19, 21 and 22, Sappey et al '509 teaches (see Figures 3-5) a diffraction grating comprising a reflective material (40) having a blazed surface as shown in Figures 3-5 with a blaze angle about 31 degrees; and an optically transmissive material (air, $n_{\text{air}} = 1.0$) disposed adjacent the reflective material having an index of refraction the blazed surface of the reflective material has approximately 172 grooves per millimeter as described in column 5, lines 44-54.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the diffraction grating of Sappey et al '509 in the communications apparatus of Sappey et al '962 in order to reduce polarization sensitivity thus providing for higher resolution and higher efficiency to minimize signal loss in the communications apparatus.

However, in further regard to claims 11, 15, 16, 19, 21 and 22, Sappey et al '692 in view of Sappey et al '509 does not teach that the blaze angle is between 32 and 41 degrees or that the blazed surface has the claimed number of grooves per millimeter.

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In regard to claims 11, 15, 16, 19, 21 and 22, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the blaze angle and the period (i.e., number of grooves per millimeter) of the apparatus of Sappey et al '692 in view of Sappey et al '509, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the blaze angle and the period for the purpose of improving the diffraction efficiency of the grating and to thus provide for higher resolution and minimization of signal loss in the communications apparatus. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

5. Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sappey et al US 6,304,692 in view of Sappey et al US 6,400,509 and further in view of Knop US 4,426,130.

Regarding claims 12 and 20, Sappey et al '962 in view of Sappey et al '509 teaches the invention as set forth above but does not teach that the number of grooves per millimeter is between about 520-560. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the period (i.e., number of grooves per millimeter) of the apparatus of Sappey et al '962 in view of Sappey et al '509, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to adjust the period for the purpose of improving the diffraction efficiency of the grating and to thus provide for

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higher resolution and minimization of signal loss in the communications apparatus. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235

Further, in regard to claims 12 and 20, Sappey et al '962 in view of Sappey et al '509 does not teach that the index of refraction of an optically transmissive material is between about 1.44 and about 1.64.

In regard to claims 12 and 20, Knop teaches that the index of refraction of an optically transmissive material is between about 1.44 and about 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material of Knop in the device of Sappey et al '962 in view of Sappey et al '509 in order to further increase the efficiency of the grating and to thus provide for higher resolution and minimization of signal loss in the communications apparatus as described in column 1, lines 62-68 and column 2, lines 1-3 of Knop.

Allowable Subject Matter

6. Claims 3, 8, 13, 14, 17 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 3 and 13 are allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the diffraction order associated with the lowest loss is the second order" as set forth in the claimed combination.

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Claims 8 and 17 are allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the diffraction order associated with the lowest loss is the fourth order" as set forth in the claimed combination.

Claim 14 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the diffraction grating has an efficiency of at least 75% over the C-band wavelength range" as set forth in the claimed combination.

Claim 18 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "the diffraction grating has an efficiency of at least 70% over the C-band wavelength range" as set forth in the claimed combination.

The prior art of record, Sappey et al and Knop teach a wavelength division device comprising first and second coupling components and a diffraction grating comprising a reflective material having a blazed surface with the claimed blaze angles and wherein the index of refraction of the optically transmissive material disposed adjacent the reflective material having an index of refraction between about 1.44 and 1.64. However, the prior art of record does not teach that the diffraction order associated with the lowest loss is the second or fourth order or that the diffraction grating has an efficiency of at least 70% or 75% over the C-band wavelength range and there is no motivation or teaching to modify this difference as derived.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava/vq
20 July 2005

Alessandro Amari

Alessandro Amari

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